Common problems we've seen and their consequences

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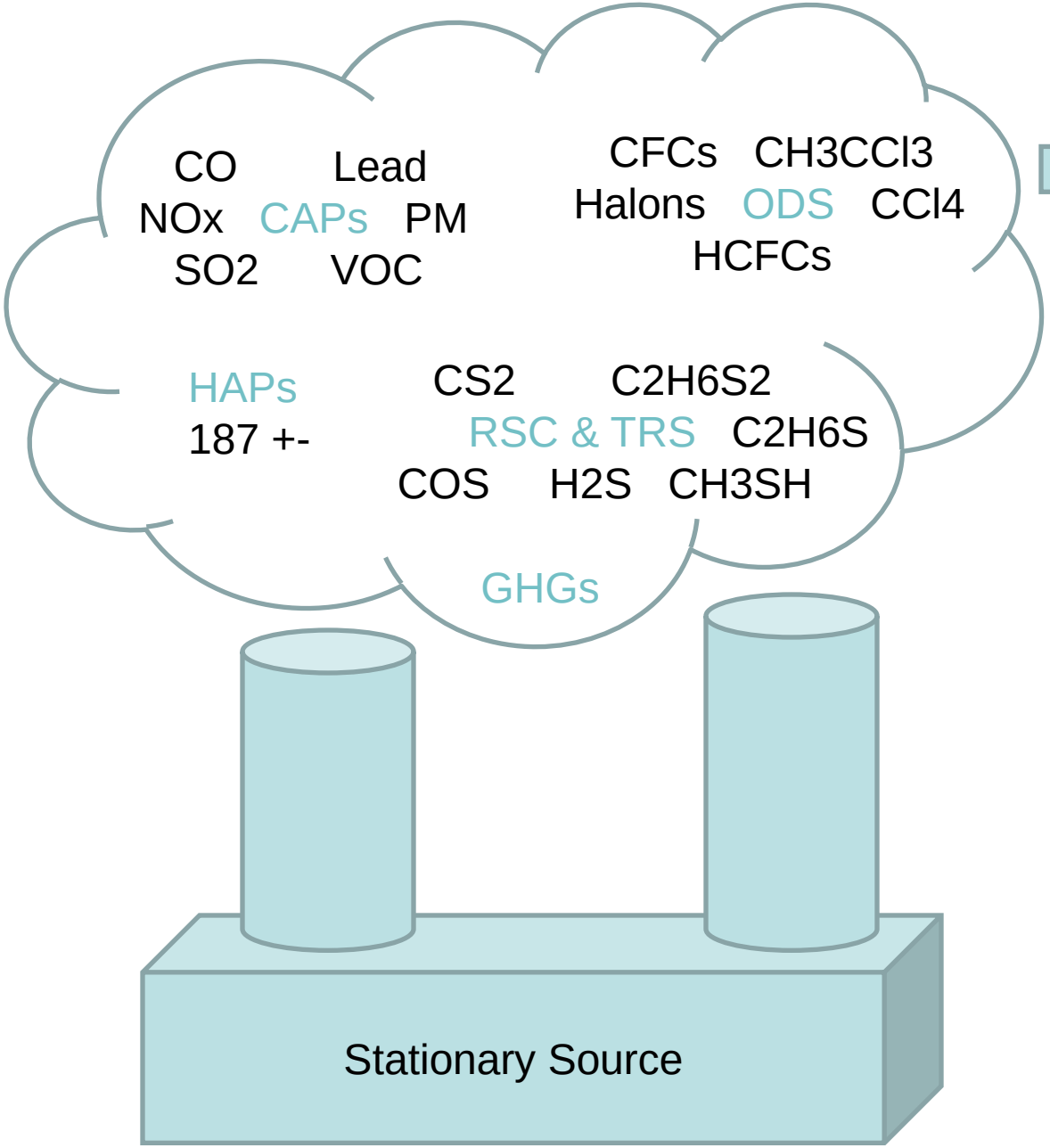
WV Department of Environmental Protection – Division of Air Quality

May 11, 2009



i-STEPS (NEI)
- CES
- TRI
- CAMD

AQ Modeling
- SIPs
- NATA
- RSEI

Publications
- Annual Report
- S.O.T.E.
- Others

Planning / Air Quality Modeling

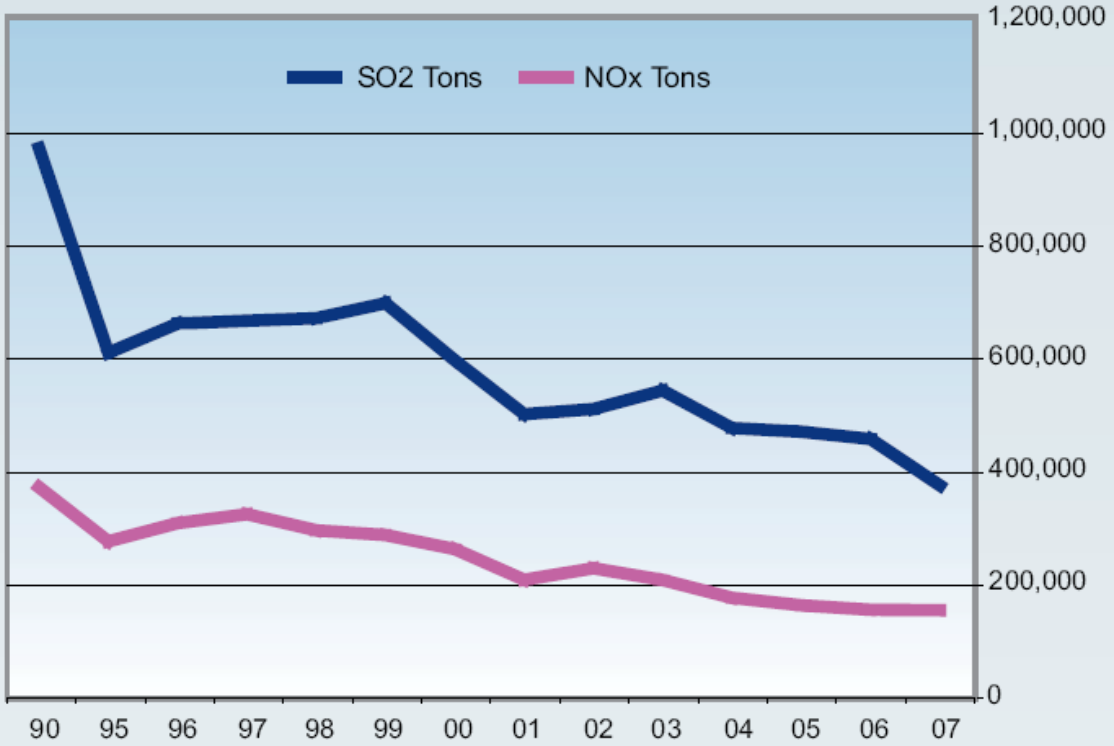
State Implementation Plans
National Air Toxics Assessment
Risk Screening Environmental Indicators

Publications

Air Quality Annual Report
WV DEP State Of The Environment
Others – News Media

WV Power Plant Emissions 1990-2007

(Calendar year 2007 Emission Data from US EPA is not yet final)



NAAQS, sulfur dioxide causes respiratory problems especially for those individuals with existing lung diseases. Sulfur dioxide, like nitrogen dioxide, is a precursor for acid rain, combining with water to form sulfuric acid. It is also known to damage vegetation. The NAAQS standard for sulfur dioxide is 0.03 parts per million (annual average, arithmetic mean). In 2007 sulfur dioxide was monitored in seven counties in West Virginia.

West Virginia Power Plant Emissions

Traditionally, coal-fired electric generating utilities have the highest emissions of nitrogen oxides (NO_X) and sulfur dioxides (SO_2), but these emissions have been nearly cut in half over the past decade. The will help West Virginia meet and maintain the NAAQS for ground-level ozone and fine particulates.

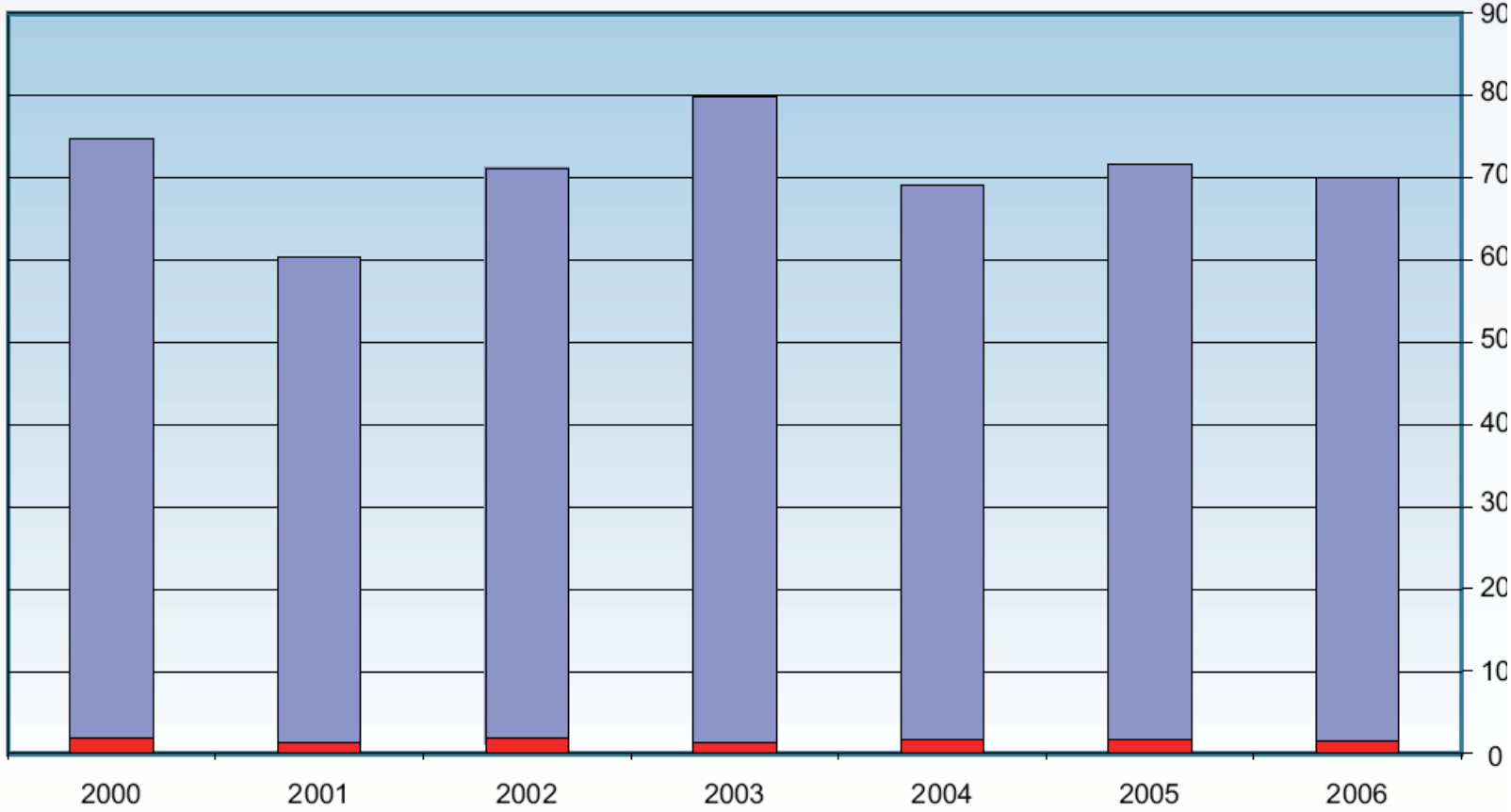
Toxic Air Releases

the eastern United States by 70 percent, and NO_x emissions by 60 percent, much of this from coal-fired electric generating utilities. Additionally, CAIR

The graph (below) shows total statewide toxic air releases from 2000 through 2006. During that time,

Toxic Air Releases in WV

in Millions of Pounds

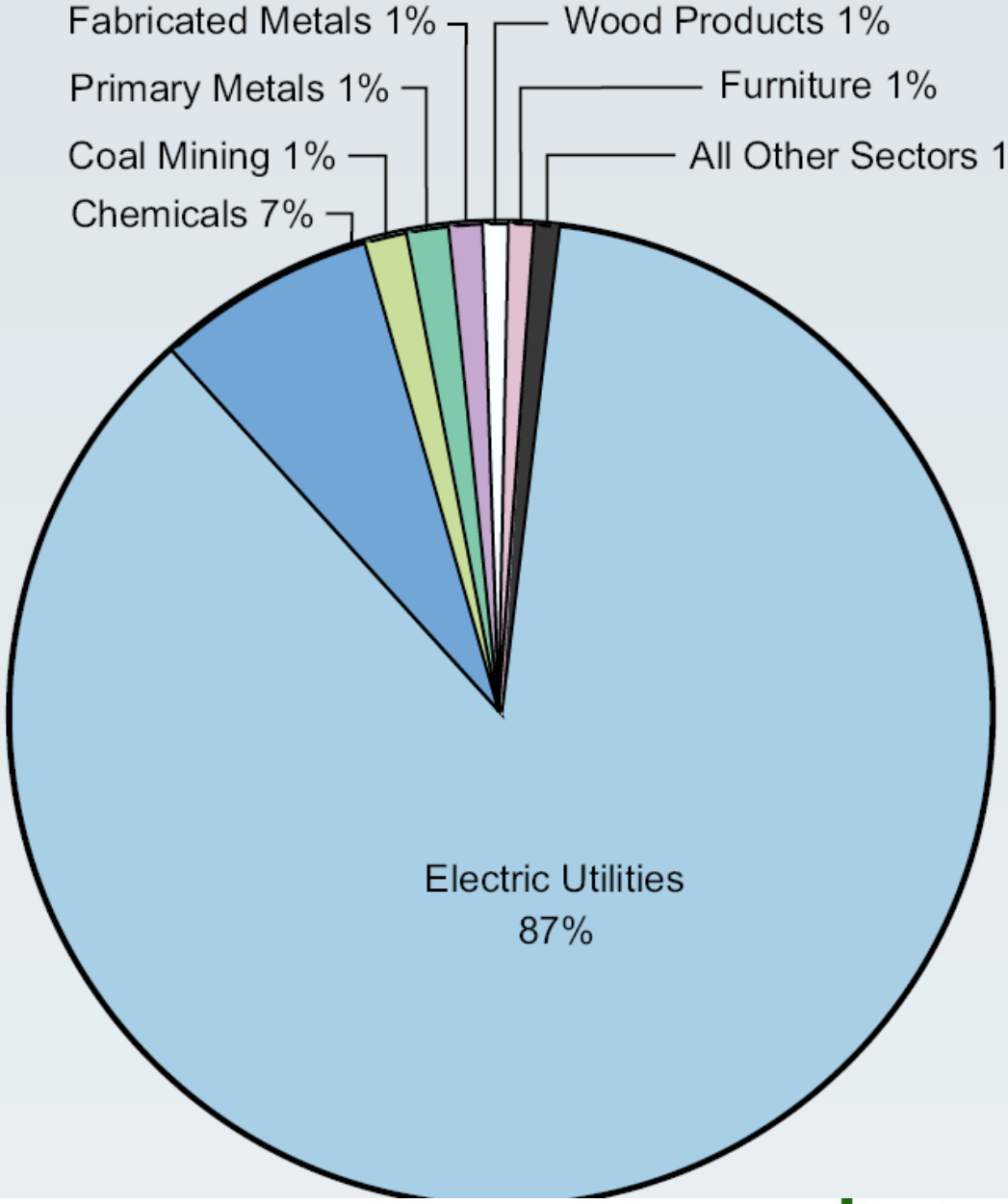


ource: US EPA Toxic Release Inventory; National Institute for Chemical Studies

2006 Toxic Air Releases by Industry Sector

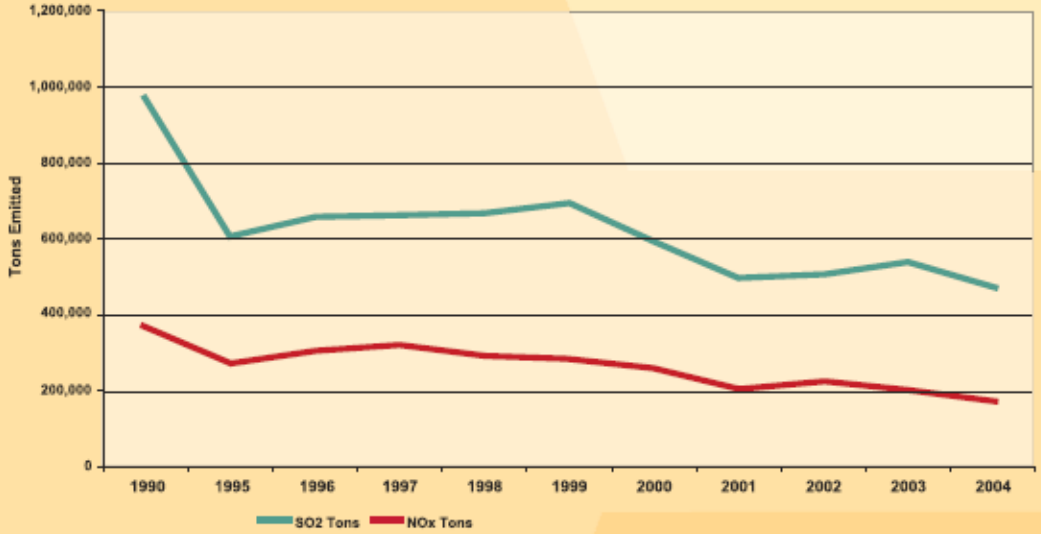
69.1 Million Pounds of Toxic Air Releases

Source: US EPA Toxic Release inventory

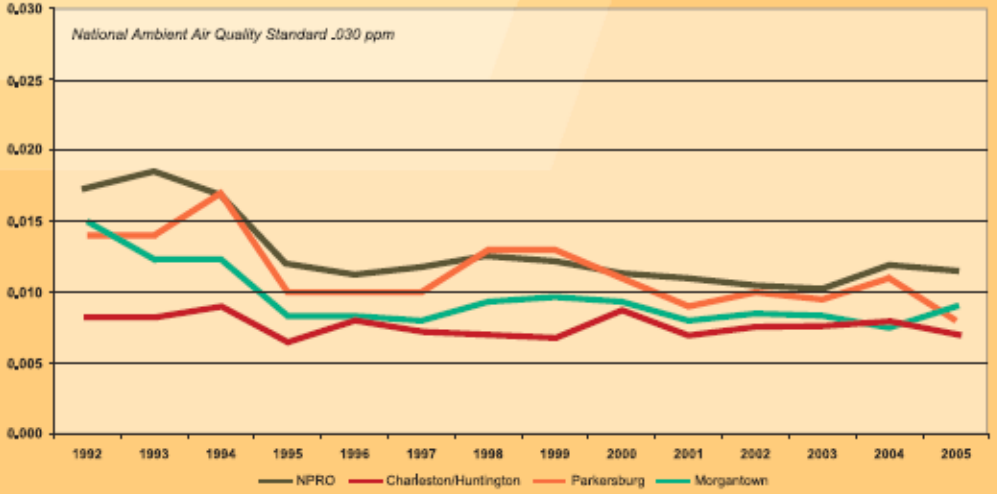


emissions by 60 percent, much of this from coal-fired electric generating utilities. Additionally, CAIR will help West Virginia meet and maintain the NAAQS for ground-level ozone and fine particulate. A closely related action, the Clean Air Mercury Rule, contains the first federally mandated requirement that coal-fired power plants reduce emissions of mercury. Together, these important new regulatory requirements will result in significant emission reductions over the next 10 years.

West Virginia Power Plant Emissions 1990-2004



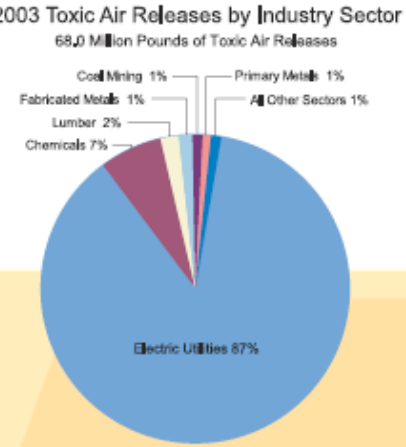
Sulfur Dioxide Average Concentration

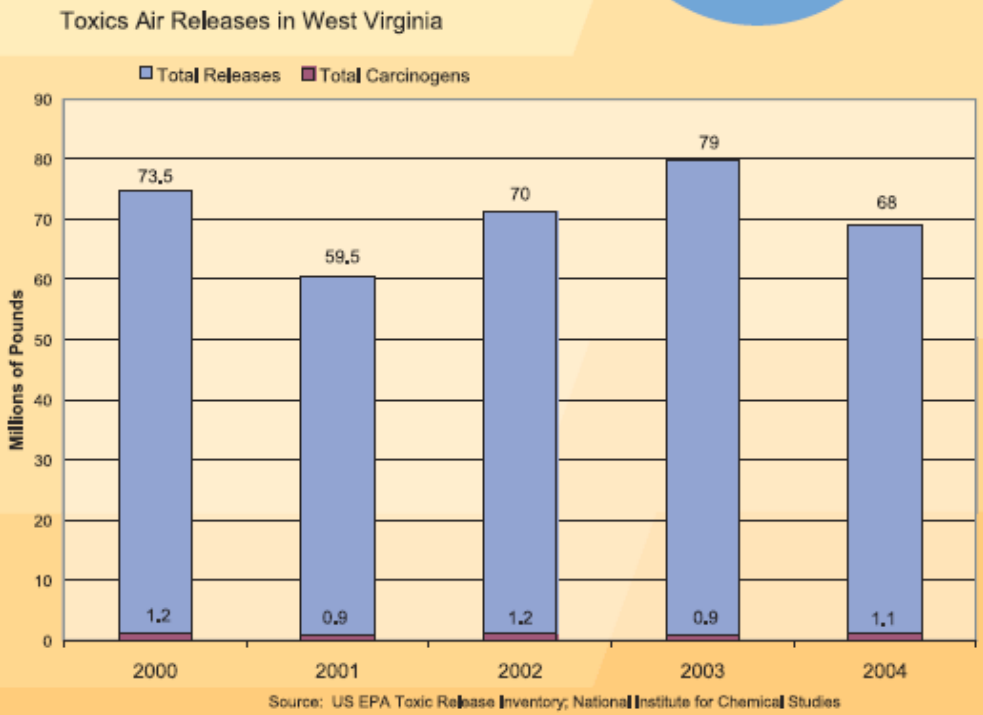


Toxic Air Releases

The EPA established the Toxic Release Inventory (TRI) under the federal Emergency Planning and Community Right to Know Act of 1986. The TRI tracks the releases of more than 650 different toxic chemicals to the air, water, and soil. Toxic chemicals are those that present a serious hazard to human health or the environment. These compounds include those known to cause cancer and to have other life-threatening health effects. In 1998, the EPA added electrical utilities, mining operations, hazardous waste facilities, and chemical wholesalers to the list of industries required to report under TRI. The addition of these industries, and the periodic addition and deletion of chemicals from the reportable list, makes trend analysis difficult.

The graph below shows total statewide toxic air releases for 2000-2004. During that time, the reporting industries and reportable chemicals remained fairly consistent. The pie chart at the right shows toxic air releases in 2004 by industry sector. Several factors affecting the trends in toxic air releases from 2000 through 2004 are changing demands on power output from the electrical utilities sector; variability in coal composition; and increased awareness of reporting requirements. Due to EPA's reporting timelines the 2005 data are not yet available.

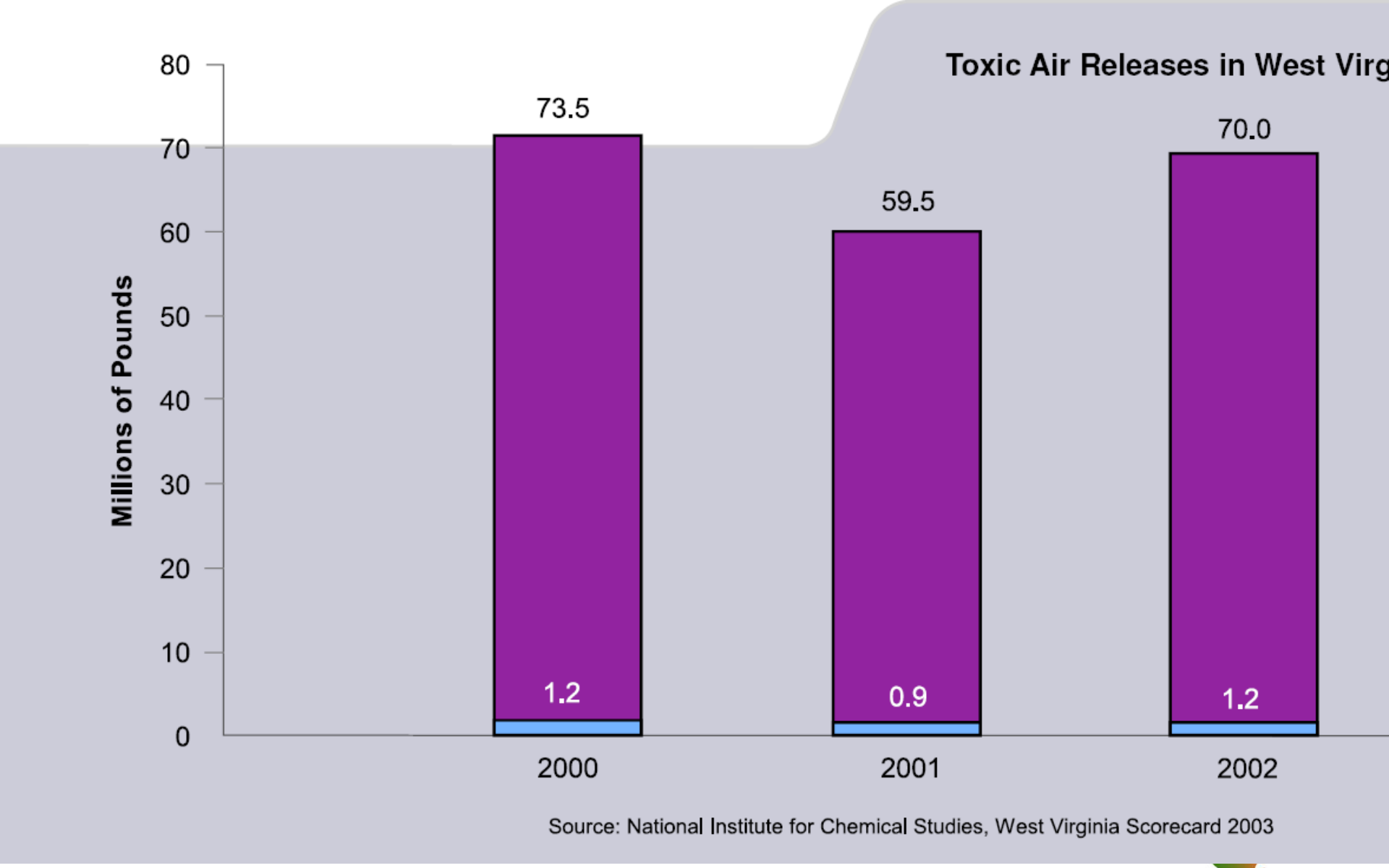


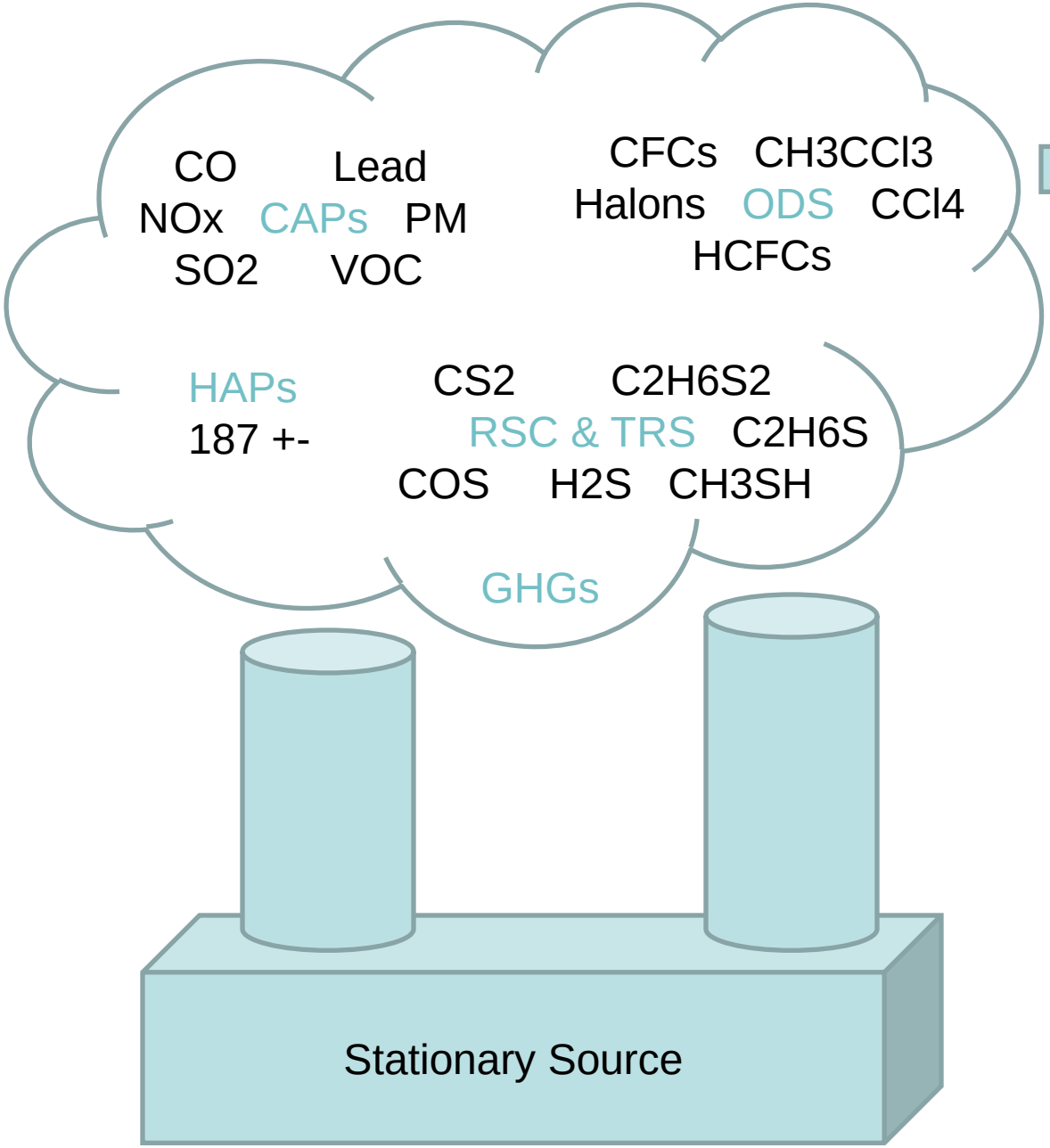


Toxic Air Releases by Industry Sector (in pounds)

	YEAR		
	2000	2001	2002
Coal Mining	1,078,558	553,254	568,833
Food & Kindred Products	3,861	6,299	500
Tobacco Products	3,032	3,070	2,074
Lumber & Wood Products	1,504,827	1,344,405	1,442,266
Printing, Publishing & Allied Industries	189,229	4,125	131,654
Chemical & Allied Products	5,284,141	5,040,487	5,127,357
Petroleum Refining & Related Industries	204,523	183,333	305,511
Rubber & Miscellaneous Plastic Products	225,861	284,115	172,353
Stone, Clay, Glass & Concrete Products	188,515	95,701	75,176
Primary Metals Industries	1,240,373	975,522	951,063
Fabricated Metal Products	999,680	765,955	818,804
Industrial & Commercial Machinery & Computer Equipment	54,920	8,911	3,119
Electronic & Other Electrical Equipment, except Computer Equipment	829	626	525
Transportation Equipment	26,660	3,331	3,993
Measuring, Analyzing & Controlling Instruments; Photographic,			
Medical &Optical Goods; Watches & Clocks	15,728	21,773	37,422
Miscellaneous Manufacturing Industries	11,880	10,820	12,577
Electric, Gas & Sanitary Services	62,441,198	50,170,198	60,312,661
Wholesale Trade - Nondurable (limited to chemical and			
petroleum bulk terminals)	11,291	5,405	3,936
Business Services (limited to solvent recovery facilities)	18	2,464	1,721

Source: National Institute for Chemical Studies


Toxic Air Releases in West Virg
Millions of Pounds
80
70
60
50
40
30
20
10
0
73.5
59.5
70.0
1.2
0.9
1.2
2000
2001
2002
Source: National Institute for Chemical Studies, West Virginia Scorecard 2003



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USA TODAY
Home
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SPECIAL REPORT
The Smokestack Effect
Toxic Air and America's Schools
USA TODAY used an EPA model to track the path of industrial pollution and mapped the locations of almost 128,000 schools to determine the levels of toxic chemicals outside. The potential problems that emerged were widespread, insidious and largely unaddressed.
Photo by Garrett Hubbard, USA TODAY
Find your school
* required
School Name
City/County
* Select a State
Search

USA TODAY

The Smokestack Effect: Toxic Air and America's Schools: USA TODAY used an EPA model to track the path of industrial pollution and mapped the locations of almost 128,000 schools to determine the levels of toxic chemicals outside. The potential problems that emerged were widespread, insidious and largely unaddressed.

Latest Stories

- **Schools near industry face chemical dangers**

The exposure to toxic chemicals in the air outside some schools appears so high that students could be at risk of suffering a range of ailments, from asthma to cancer.

- **'Weird' smell set off investigation at Ohio school**

After an annual Oktoberfest celebration at school, parents pushed for action to address pollution issues.

- **No one knows what level of chemicals harms children**

Most safety assessments based on the effect chemicals have on adults in workplace, not on kids at school.

- **Air tests reveal elevated levels of toxics at schools**

The exposure to toxic chemicals in the air at some schools is so high that students are at risk of suffering a range of ailments, from asthma to cancer.

- **Officials vow air near schools will be tested for toxics**

ensure monitoring across the U.S. Boxer calls lack of monitoring a "shocking story of child neglect."

- **Cooperation helped Louisville pull off a cleanup coup**

For years, Louisville has been known for fast horses, fine bourbon, a love of college basketball — and lousy air.

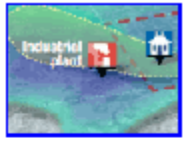
- **Young students often most vulnerable to toxic air**

USA TODAY found 20,000 schools within a half-mile of a major industrial plant that emits potentially dangerous chemicals. Many of those locations are elementary or pre-kindergarten schools.

- **Possible air hazards rarely considered in plans for schools**

Twenty-three states have no regulations to compel school officials to consider environmental dangers when picking a spot to build.

- **EPA nominee pledges to address toxic hot spots around schools**



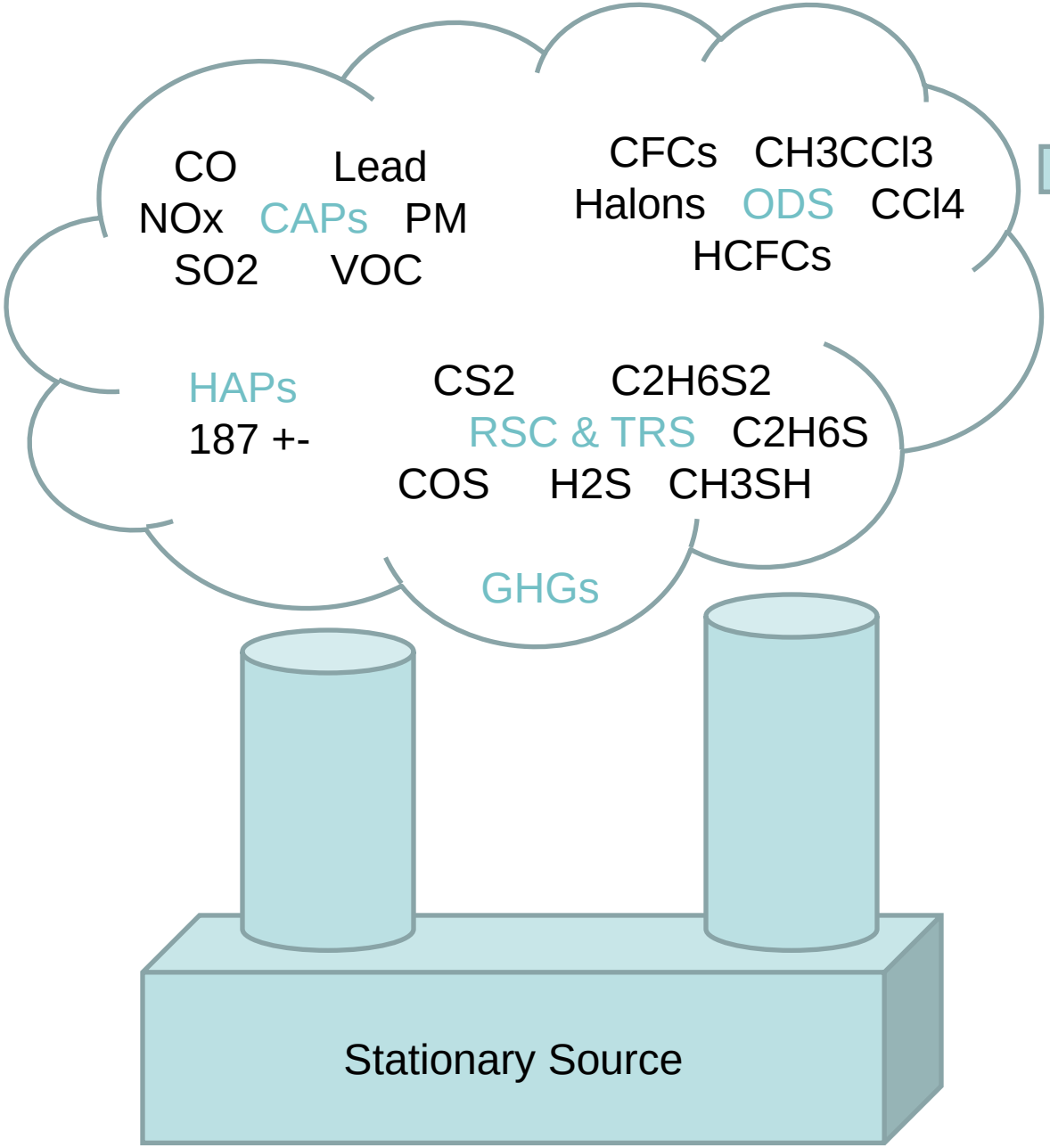
Each refinery, steel mill or factory that emits a significant amount of toxic chemicals must report how much it releases each year to the Environmental Protection Agency. EPA periodically calculates how those chemicals are dispersed through every square kilometer throughout the country.

- **Video: Leading health expert explains how to use information**

Dr. Philip J. Landrigan, Chairman of the Department of Community and Preventive Medicine at the Mount Sinai School of Medicine, talks about what parents and authorities can do with information about toxic chemicals that might be outside their schools.

- **Video: A snapshot of what's in the air**

USA TODAY monitors for chemicals outside almost 100 schools around the nation. Its findings, experts say, should prompt the government to take a harder look.



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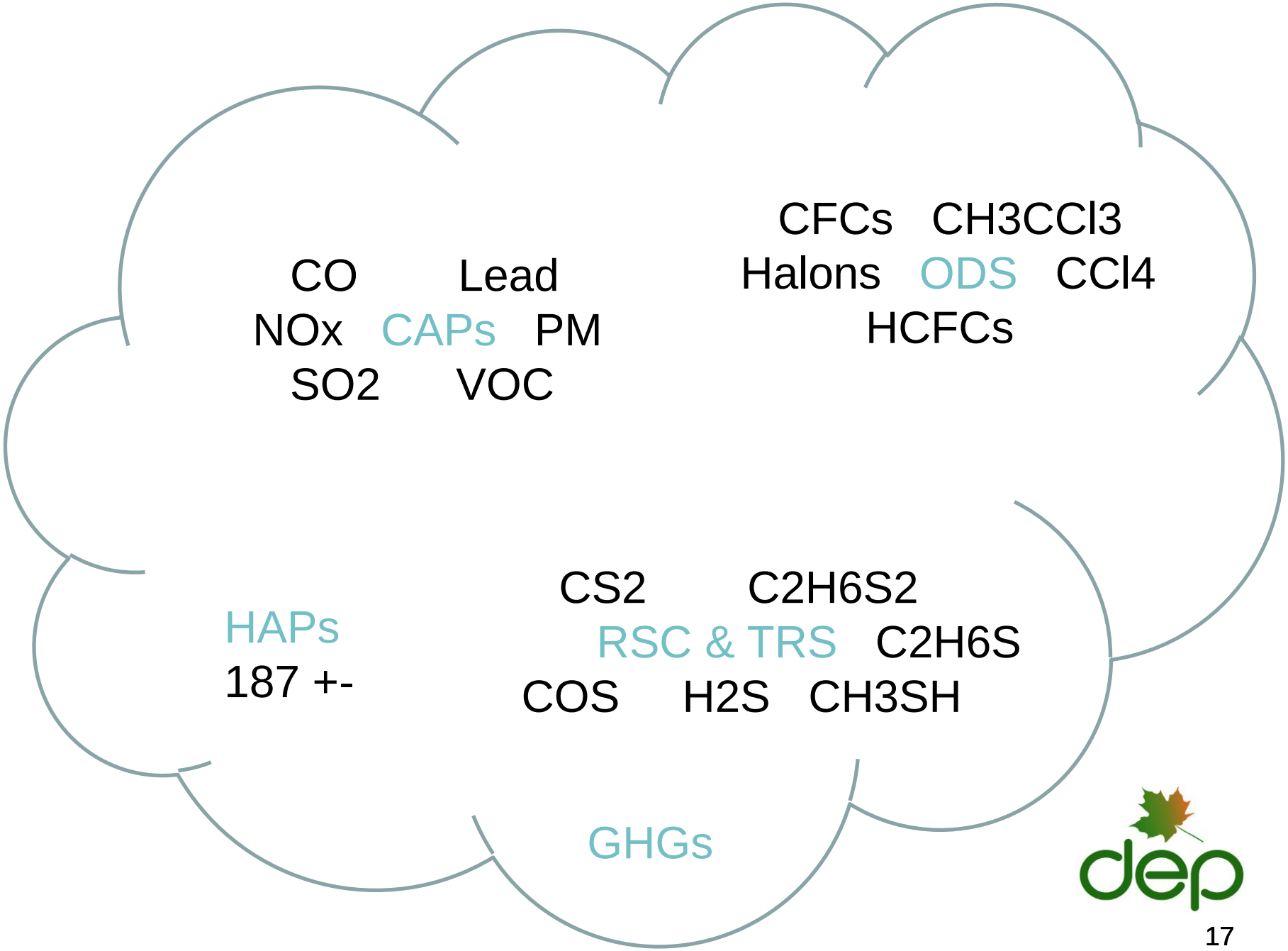

CO
Lead
NOx
CAPs
PM
SO2
VOC
CFCs
CH3CCl3
Halons
ODS
CCl4
HCFCs
CS2
C2H6S2
RSC & TRS
C2H6S
COS
H2S
CH3SH
HAPs
187 +-
GHGs

CAPs (Criteria Air Pollutants)

- CO
- NOx
- SO2
- Ozone (VOC)
- PM
- Lead

CAPs (continued)

- CO is CO is CO
- a product of incomplete combustion
- partially oxidized compound of carbon

CAPs (continued)

- NOx
- NO2 (nitrogen dioxide) + NO (nitric oxide)
- note – nitrous oxide (N2O) is not part of NOx, but instead N2O is a greenhouse gas

CAPs (continued)

- SO2 is SO2 is SO2
- sulfur in fuel burned will oxidize to SO2

CAPs (continued)

- O3 (ozone) precursors
- Ozone is not directly emitted in any significant quantity
- Ozone results from photochemical reaction of NO2 and VOC
- In WV, our ozone SIPs rely on regulating VOC, therefore the reportable pollutant is VOC as defined by regulation

CAPs (continued)

- VOC (ground-level ozone precursors)

- Chemical compounds are made up of 2 or more elements
- Organic means (with very limited exceptions) – any compound containing carbon
- Volatile – refers to reactivity to form ozone

CAPs (continued)

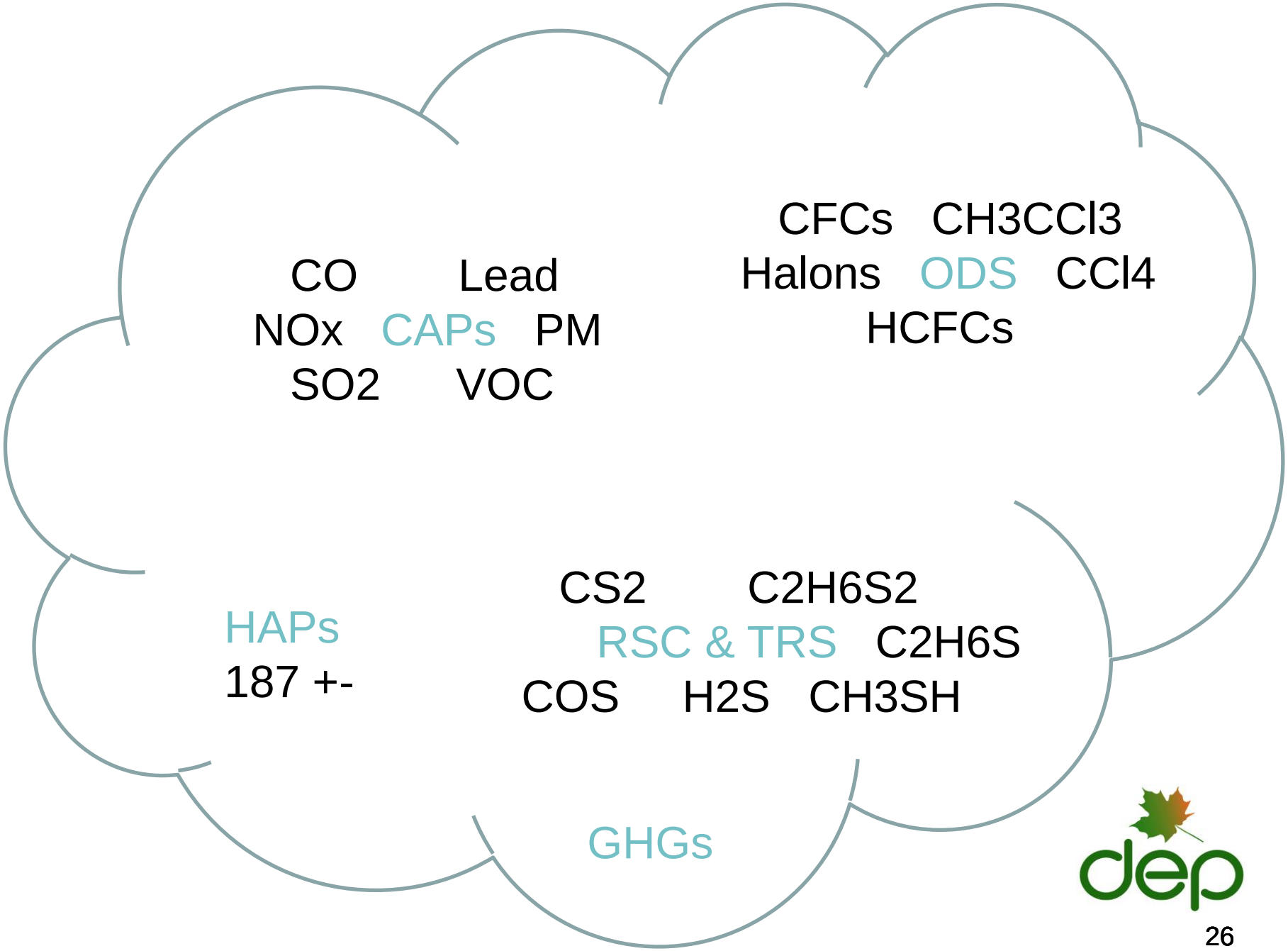
- Particulate matter and its precursors

- PM 2.5 precursors:

- NH3 (ammonia)
- NO2 (nitrogen dioxide)
- SO2 (sulfur dioxide)
- Sulfates

CAPs (continued)

- Pb (lead) was the last of the six criteria pollutants to get regulated for its NAAQS
- The lead NAAQS was changed recently
- Pb is an interesting case because lead compounds are also regulated as hazardous air pollutants (HAPs)


CO Lead
NOx CAPs PM
SO2 VOC
CFCs CH3CCl3
Halons ODS CCl4
HCFCs
HAPs
187 +-
CS2 C2H6S2
RSC & TRS C2H6S
COS H2S CH3SH
GHGs

187 Hazardous Air Pollutants (HAPs)

- 1990 Clean Air Act Amendments included a list of189 hazardous air pollutants

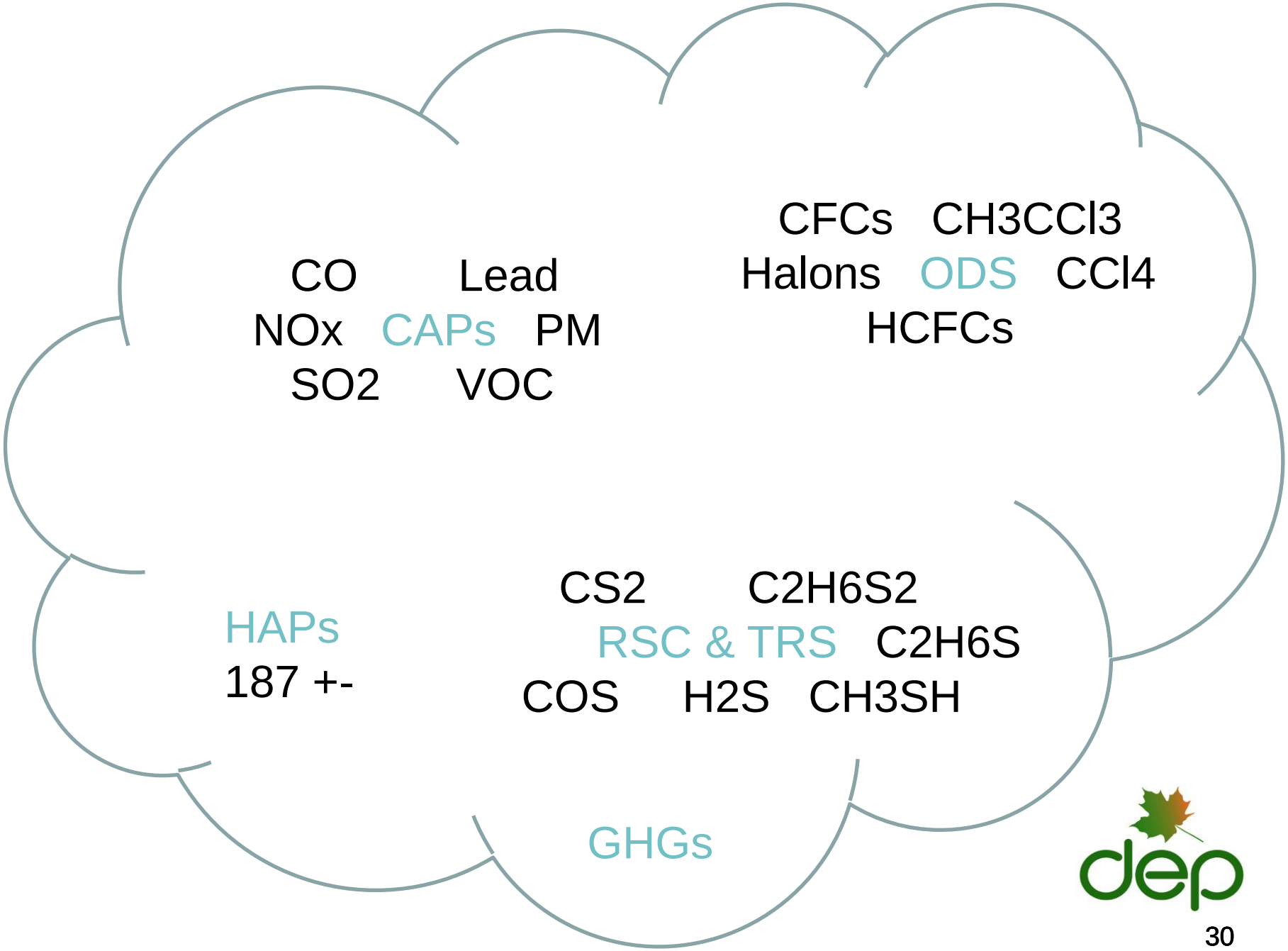
- Hydrogen sulfide would have made 190 HAPs but hydrogen sulfide was not intended to be on the HAP list

75070	Acetaldehyde
60355	Acetamide
75058	Acetonitrile
98862	Acetophenone
53963	2-Acetylaminofluorene
107028	Acrolein
79061	Acrylamide
79107	Acrylic acid
107131	Acrylonitrile
107051	Allyl chloride
92671	4-Aminobiphenyl
62533	Aniline
90040	o-Anisidine
1332214	Asbestos
71432	Benzene (including benzene from gasoline)
92875	Benzidine
98077	Benzotrichloride
100447	Benzyl chloride
92524	Biphenyl
117817	Bis(2-ethylhexyl)phthalate (DEHP)
542881	Bis(chloromethyl)ether
75252	Bromoform
106990	1,3-Butadiene
156627	Calcium cyanamide
105602	Caprolactam(See Modification)
133062	Captan
63252	Carbaryl
75150	Carbon disulfide
56235	Carbon tetrachloride
463581	Carbonyl sulfide
120809	Catechol
133904	Chloramben
57749	Chlordane
7782505	Chlorine
79118	Chloroacetic acid
532274	2-Chloroacetophenone
108907	Chlorobenzene
510156	Chlorobenzilate
67663	Chloroform
107302	Chloromethyl methyl ether
126998	Chloroprene
1319773	Cresols/Cresylic acid (isomers and mixture)
95487	o-Cresol
108394	m-Cresol
106445	p-Cresol
98828	Cumene
94757	2,4-D, salts and esters
3547044	DDE
334883	Diazomethane
132649	Dibenzofurans
96128	1,2-Dibromo-3-chloropropane
84742	Dibutylphthalate
106467	1,4-Dichlorobenzene(p)
91941	3,3-Dichlorobenzidene
111444	Dichloroethyl ether (Bis(2-chloroethyl)ether)
542756	1,3-Dichloropropene
62737	Dichlorvos
111422	Diethanolamine
121697	N,N-Dimethylaniline
64675	Diethyl sulfate
119904	3,3-Dimethoxybenzidine
60117	Dimethyl aminoazobenzene
119937	3,3'-Dimethyl benzidine
79447	Dimethyl carbamoyl chloride
68122	Dimethyl formamide
57147	1,1-Dimethyl hydrazine
131113	Dimethyl phthalate
77781	Dimethyl sulfate
534521	4,6-Dinitro-o-cresol, and salts
51285	2,4-Dinitrophenol
121142	2,4-Dinitrotoluene
123911	1,4-Dioxane (1,4-Diethyleneoxide)
122667	1,2-Diphenylhydrazine
106898	Epichlorohydrin (l-Chloro-2,3-epoxypropane)
106887	1,2-Epoxybutane
140885	Ethyl acrylate
100414	Ethyl benzene
51796	Ethyl carbamate (Urethane)
75003	Ethyl chloride (Chloroethane)
106934	Ethylene dibromide (Dibromoethane)
107062	Ethylene dichloride (1,2-Dichloroethane)
107211	Ethylene glycol
151564	Ethylene imine (Aziridine)
75218	Ethylene oxide
96457	Ethylene thiourea
75343	Ethylidene dichloride (1,1-Dichloroethane)
50000	Formaldehyde
76448	Heptachlor
118741	Hexachlorobenzene
87683	Hexachlorobutadiene
77474	Hexachlorocyclopentadiene
67721	Hexachloroethane
822060	Hexamethylene-1,6-diisocyanate
680319	Hexamethylphosphoramide
110543	Hexane
302012	Hydrazine
7647010	Hydrochloric acid
7664393	Hydrogen fluoride (Hydrofluoric acid)
7783064	Hydrogen sulfide(See Modification)
123319	Hydroquinone
78591	Isophorone
58899	Lindane (all isomers)
108316	Maleic anhydride
67561	Methanol
72435	Methoxychlor
74839	Methyl bromide (Bromomethane)
74873	Methyl chloride (Chloromethane)
71556	Methyl chloroform (1,1,1-Trichloroethane)
78933	Methyl ethyl ketone (2-Butanone)(See Modification)
60344	Methyl hydrazine
74884	Methyl iodide (Iodomethane)
108101	Methyl isobutyl ketone (Hexone)
624839	Methyl isocyanate
80626	Methyl methacrylate
1634044	Methyl tert butyl ether
101144	4,4-Methylene bis(2-chloroaniline)
75092	Methylene chloride (Dichloromethane)
101688	Methylene diphenyl diisocyanate (MDI)
101779	4,4'-Methylenedianiline
91203	Naphthalene
98953	Nitrobenzene
92933	4-Nitrobiphenyl
100027	4-Nitrophenol
79469	2-Nitropropane
684935	N-Nitroso-N-methylurea
62759	N-Nitrosodimethylamine
59892	N-Nitrosomorpholine
56382	Parathion
82688	Pentachloronitrobenzene (Quintobenzene)
87865	Pentachlorophenol
108952	Phenol
106503	p-Phenylenediamine
75445	Phosgene
7803512	Phosphine
7723140	Phosphorus
85449	Phthalic anhydride
1336363	Polychlorinated biphenyls (Aroclors)
1120714	1,3-Propane sultone
57578	beta-Propiolactone
123386	Propionaldehyde
114261	Propoxur (Baygon)
78875	Propylene dichloride (1,2-Dichloropropane)
75569	Propylene oxide
75558	1,2-Propylenimine (2-Methyl aziridine)
91225	Quinoline
106514	Quinone
100425	Styrene
96093	Styrene oxide
1746016	2,3,7,8-Tetrachlorodibenzo-p-dioxin
79345	1,1,2,2-Tetrachloroethane
127184	Tetrachloroethylene (Perchloroethylene)
7550450	Titanium tetrachloride
108883	Toluene
95807	2,4-Toluene diamine
584849	2,4-Toluene diisocyanate
95534	o-Toluidine
8001352	Toxaphene (chlorinated camphene)
120821	1,2,4-Trichlorobenzene
79005	1,1,2-Trichloroethane
79016	Trichloroethylene
95954	2,4,5-Trichlorophenol
88062	2,4,6-Trichlorophenol
121448	Triethylamine
1582098	Trifluralin
540841	2,2,4-Trimethylpentane
108054	Vinyl acetate
593602	Vinyl bromide
75014	Vinyl chloride
75354	Vinylidene chloride (1,1-Dichloroethylene)
1330207	Xylenes (isomers and mixture)
95476	o-Xylenes
108383	m-Xylenes
106423	p-Xylenes
0	Antimony Compounds
0	Arsenic Compounds (inorganic including arsine)
0	Beryllium Compounds
0	Cadmium Compounds
0	Chromium Compounds
0	Cobalt Compounds
0	Coke Oven Emissions
0	Cyanide Compounds1
0	Glycol ethers2
0	Lead Compounds
0	Manganese Compounds
0	Mercury Compounds
0	Fine mineral fibers3
0	Nickel Compounds
0	Polycyclic Organic Matter4
0	Radionuclides (including radon)5
0	Selenium Compounds

NOTE: For all listings above which contain the word "compounds" and for glycol ethers, the following applies: Unless otherwise specified, these listings are defined as including any unique chemical substance that contains the named

187 HAPs (continued)

- A recent FR proposal may put H2S on the HAP list
- Caprolactam was removed from the HAP list 10 years ago
- Methyl ethyl ketone was removed from the HAP list last year
- A 2005 FR proposal may remove methylene diphenyl diisocyanate (MDI) from the HAP list someday


CO Lead
NOx CAPs PM
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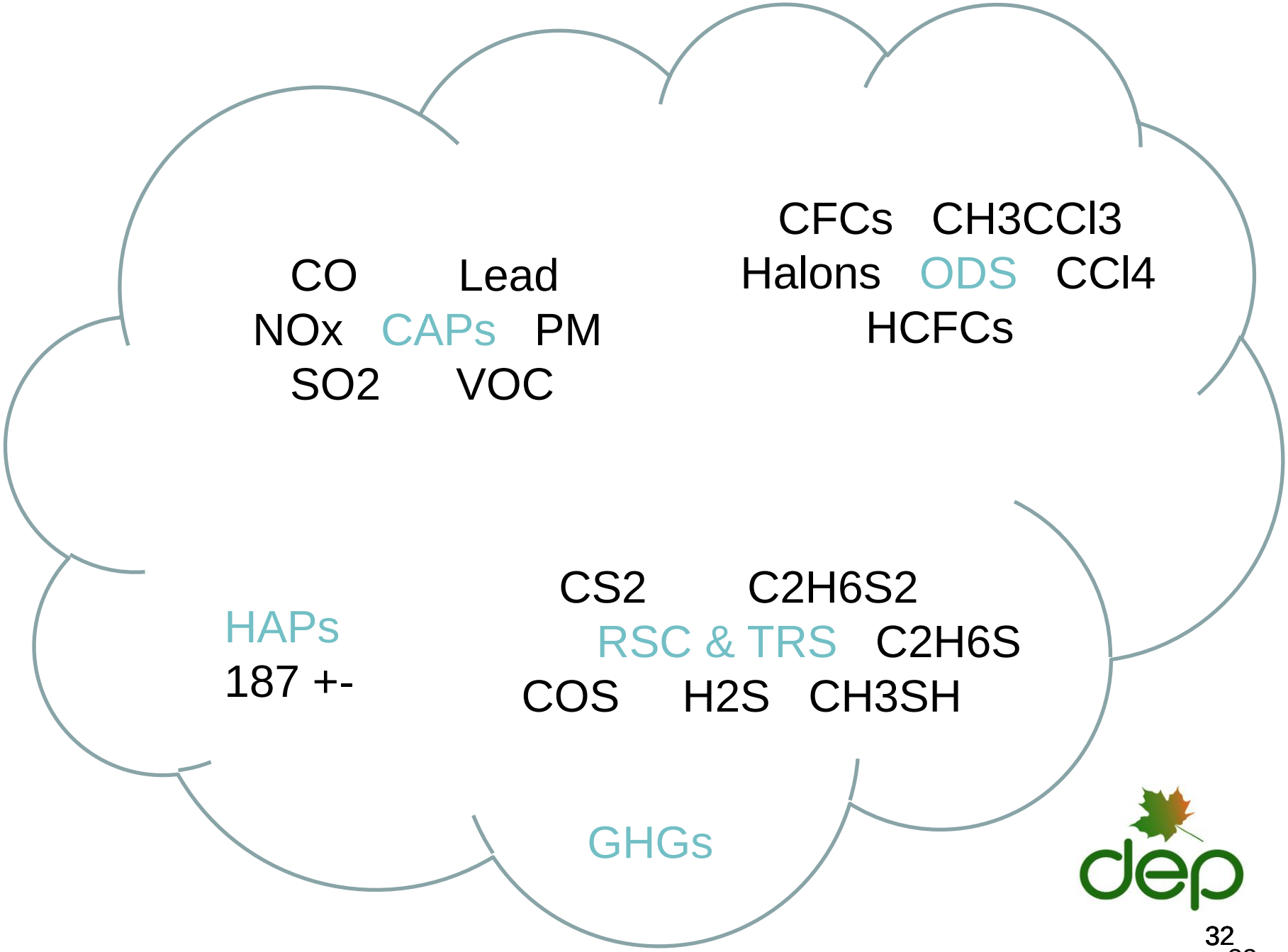
Halons ODS CCl4
HCFCs
HAPs
187 +-
CS2 C2H6S2
RSC & TRS C2H6S
COS H2S CH3SH
GHGs

Sulfur compounds (RSC & TRS)

- CS2, COS, and H2S are “reduced sulfur compounds” as defined by regulation

- H2S, CH3SH, C2H6S, and C2H6S2 are “total reduced sulfur” as defined by regulation


CO
Lead
NOx
CAPs
PM
SO2
VOC
CFCs
CH3CCl3
Halons
ODS
CCl4
HCFCs
CS2
C2H6S2
RSC & TRS
C2H6S
COS
H2S
CH3SH
HAPs
187 +-
GHGs

32

WebElements: the periodic table on the world-wide web

http://www.webelements.com/

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
hydrogen 1 **H** 1.00794(7)			Key: element name atomic number **symbol** 2003 atomic weight (mean relative mass)														helium 2 **He** 4.002602(2)
lithium 3 **Li** 6.941(2)	beryllium 4 **Be** 9.012182(3)											boron 5 **B** 10.811(7)	carbon 6 **C** 12.0107(8)	nitrogen 7 **N** 14.0067(7)	oxygen 8 **O** 15.9994(3)	fluorine 9 **F** 18.9984032(5)	neon 10 **Ne** 20.1797(6)
sodium 11 **Na** 22.989770(2)	magnesium 12 **Mg** 24.3050(6)											aluminium 13 **Al** 26.981538(2)	silicon 14 **Si** 28.0855(3)	phosphorus 15 **P** 30.973761(2)	sulfur 16 **S** 32.065(5)	chlorine 17 **Cl** 35.453(2)	argon 18 **Ar** 39.948(1)
potassium 19 **K** 39.0983(1)	calcium 20 **Ca** 40.078(4)	scandium 21 **Sc** 44.955910(8)	titanium 22 **Ti** 47.867(1)	vanadium 23 **V** 50.9415(1)	chromium 24 **Cr** 51.9961(6)	manganese 25 **Mn** 54.938049(9)	iron 26 **Fe** 55.845(2)	cobalt 27 **Co** 58.933200(9)	nickel 28 **Ni** 58.6934(4)	copper 29 **Cu** 63.546(3)	zinc 30 **Zn** 65.38(2)	gallium 31 **Ga** 69.723(1)	germanium 32 **Ge** 72.64(1)	arsenic 33 **As** 74.92160(2)	selenium 34 **Se** 78.96(3)	bromine 35 **Br** 79.904(1)	krypton 36 **Kr** 83.798(2)
rubidium 37 **Rb** 85.4678(3)	strontium 38 **Sr** 87.62(1)	yttrium 39 **Y** 88.90585(2)	zirconium 40 **Zr** 91.224(2)	niobium 41 **Nb** 92.90638(2)	molybdenum 42 **Mo** 95.96(2)	technetium 43 **Tc** [98]	ruthenium 44 **Ru** 101.07(2)	rhodium 45 **Rh** 102.90550(2)	palladium 46 **Pd** 106.42(1)	silver 47 **Ag** 107.8682(2)	cadmium 48 **Cd** 112.411(8)	indium 49 **In** 114.818(3)	tin 50 **Sn** 118.710(7)	antimony 51 **Sb** 121.760(1)	tellurium 52 **Te** 127.60(3)	iodine 53 **I** 126.90447(3)	xenon 54 **Xe** 131.293(6)
caesium 55 **Cs** 132.90545(2)	barium 56 **Ba** 137.327(7)	lutetium 71 **Lu** 174.9668(1)	hafnium 72 **Hf** 178.49(2)	tantalum 73 **Ta** 180.9479(1)	tungsten 74 **W** 183.84(1)	rhenium 75 **Re** 186.207(1)	osmium 76 **Os** 190.23(3)	iridium 77 **Ir** 192.217(3)	platinum 78 **Pt** 195.078(2)	gold 79 **Au** 196.96655(2)	mercury 80 **Hg** 200.59(2)	thallium 81 **Tl** 204.3833(2)	lead 82 **Pb** 207.2(1)	bismuth 83 **Bi** 208.98038(2)	polonium 84 **Po** [209]	astatine 85 **At** [210]	radon 86 **Rn** [222]
francium 87 **Fr** [223]	radium 88 **Ra** [226]	lawrencium 103 **Lr** [262]	rutherfordium 104 **Rf** [267]	dubnium 105 **Db** [268]	seaborgium 106 **Sg** [271]	bohrium 107 **Bh** [272]	hassium 108 **Hs** [270]	meitnerium 109 **Mt** [276]	darmstadtium 110 **Ds** [281]	roentgenium 111 **Rg** [280]	ununbium 112 **Uub** [285]	ununtrium 113 **Uut** [284]	ununquadium 114 **Uuq** [289]	ununpentium 115 **Uup** [288]	ununhexium 116 **Uuh** [293]	ununseptium 117 Uus —	ununoctium 118 **Uuo** [294]

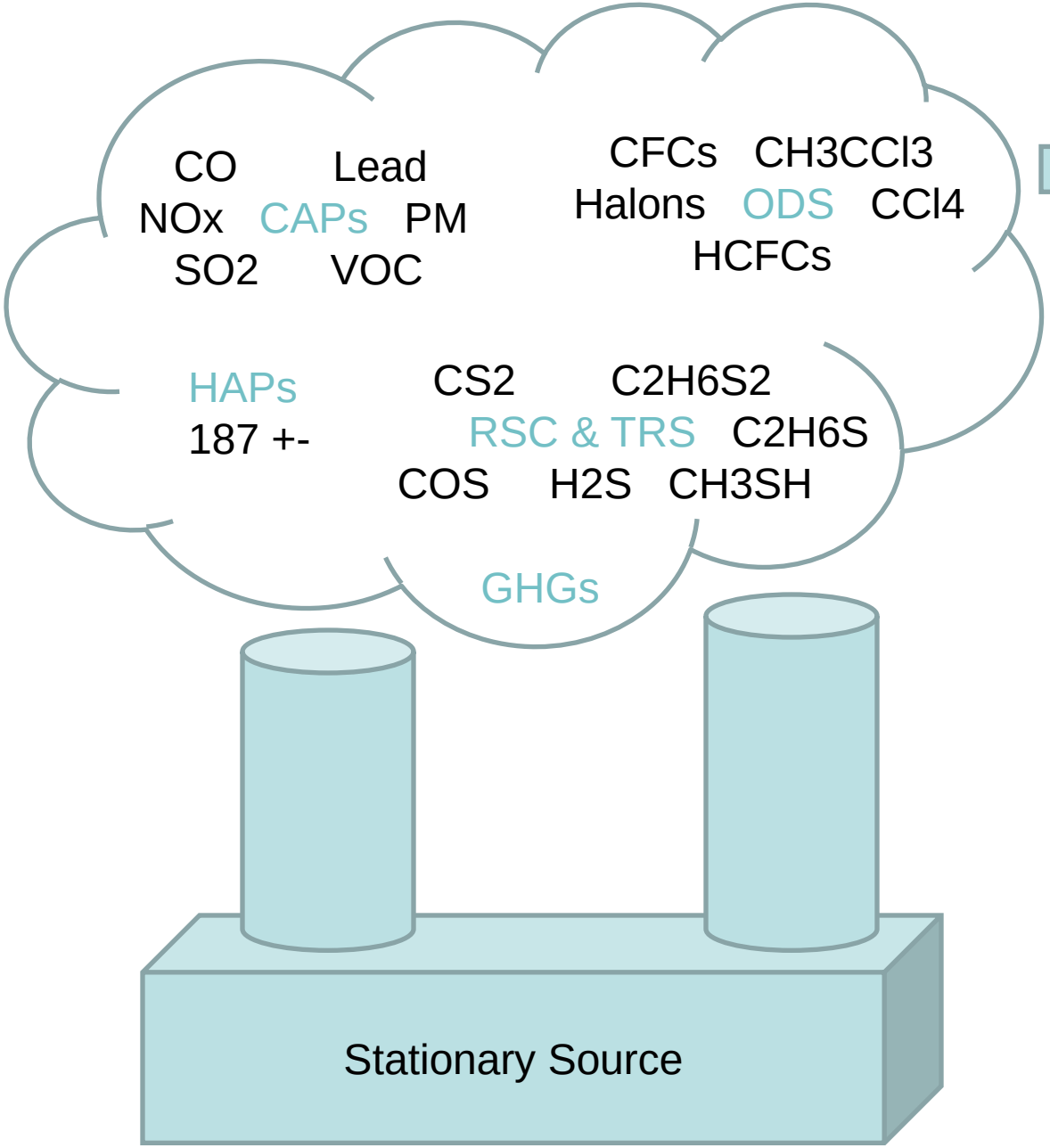
Lanthanoids	lanthanum 57 **La** 138.9055(2)	cerium 58 **Ce** 140.116(1)	praseodymium 59 **Pr** 140.90765(2)	neodymium 60 **Nd** 144.24(3)	promethium 61 **Pm** [145]	samarium 62 **Sm** 150.36(3)	europium 63 **Eu** 151.964(1)	gadolinium 64 **Gd** 157.25(3)	terbium 65 **Tb** 158.92534(2)	dysprosium 66 **Dy** 162.500(1)	holmium 67 **Ho** 164.93032(2)	erbium 68 **Er** 167.259(3)	thulium 69 **Tm** 168.93421(2)	ytterbium 70 **Yb** 173.054(5)
Actinoids	actinium 89 **Ac** [227]	thorium 90 **Th** 232.0381(1)	protactinium 91 **Pa** 231.03588(2)	uranium 92 **U** 238.02891(3)	neptunium 93 **Np** [237]	plutonium 94 **Pu** [244]	americium 95 **Am** [243]	curium 96 **Cm** [247]	berkelium 97 **Bk** [247]	californium 98 **Cf** [251]	einsteinium 99 **Es** [252]	fermium 100 **Fm** [257]	mendelevium 101 **Md** [258]	nobelium 102 **No** [259]

Element symbols and names: symbols, names, and spellings are recommended by IUPAC (http://www.iupac.org/). Names are not yet proposed for the elements beyond 111 - those used here are IUPAC's temporary systematic names (Pure & Appl. Chem., 1979, **61**, 381–384). In the USA and some other countries, the spellings **aluminum** and **cesium** are normal while in the UK and elsewhere the usual spelling is **sulphur**.
Atomic weights (mean relative masses): Apart from the heaviest elements, these are IUPAC 2007 values (Pure & Appl. Chem., 2007, **In press**). Elements with values given in brackets have no stable nuclides and are represented by integer values for the longest-lived isotope known at the time writing.
The elements thorium, protactinium, and uranium have characteristic terrestrial abundances and these are the values quoted. The last significant figure of each value is considered reliable to ±1 except where a larger uncertainty is given in parentheses.
Periodic table organisation: for a justification of the positions of the elements La, Ac, Lu, and Lr in the WebElements periodic table see W.B. Jensen, "The positions of lanthanum (actinium) and lutetium (lawrencium) in the periodic table", J. Chem. Ed., 1982, **59**, 634–636.
Group labels: the numeric system (1–18) used here is the current IUPAC convention. For a discussion of this and other common systems see: W.C. Fernelius and W.H. Powell, "Confusion in the periodic table of the elements", J. Chem. Ed., 1982, **59**, 504–508.

Ozone Depleting Substances

- Class I – CFCs, Halons, CCl_4, and CH_3CCl_3

- Class II - HCFCs



i-STEPS (NEI)
- CES
- TRI
- CAMD

AQ Modeling
- SIPs
- NATA
- RSEI

Publications
- Annual Report
- S.O.T.E.
- Others

Common Problems

- Did not use i-Steps data entry error checks
- Data folders copied or moved incorrectly
- Sending the wrong data files (use “export”)
- Failure to recalculate before submitting

Common Problems (cont'd)

- Year of inventory: 2008
- 10-digit SCCs DO NOT BELONG in a point source inventory – US EPA will reject
- Are your Source Classification Codes correct? – especially this cycle

Common Problems (cont'd)

- Activity data (annual production rates) not updated for the current inventory - or completely missing
- Quarterly throughput must total 95-101%
- Capture efficiency vs. control efficiency

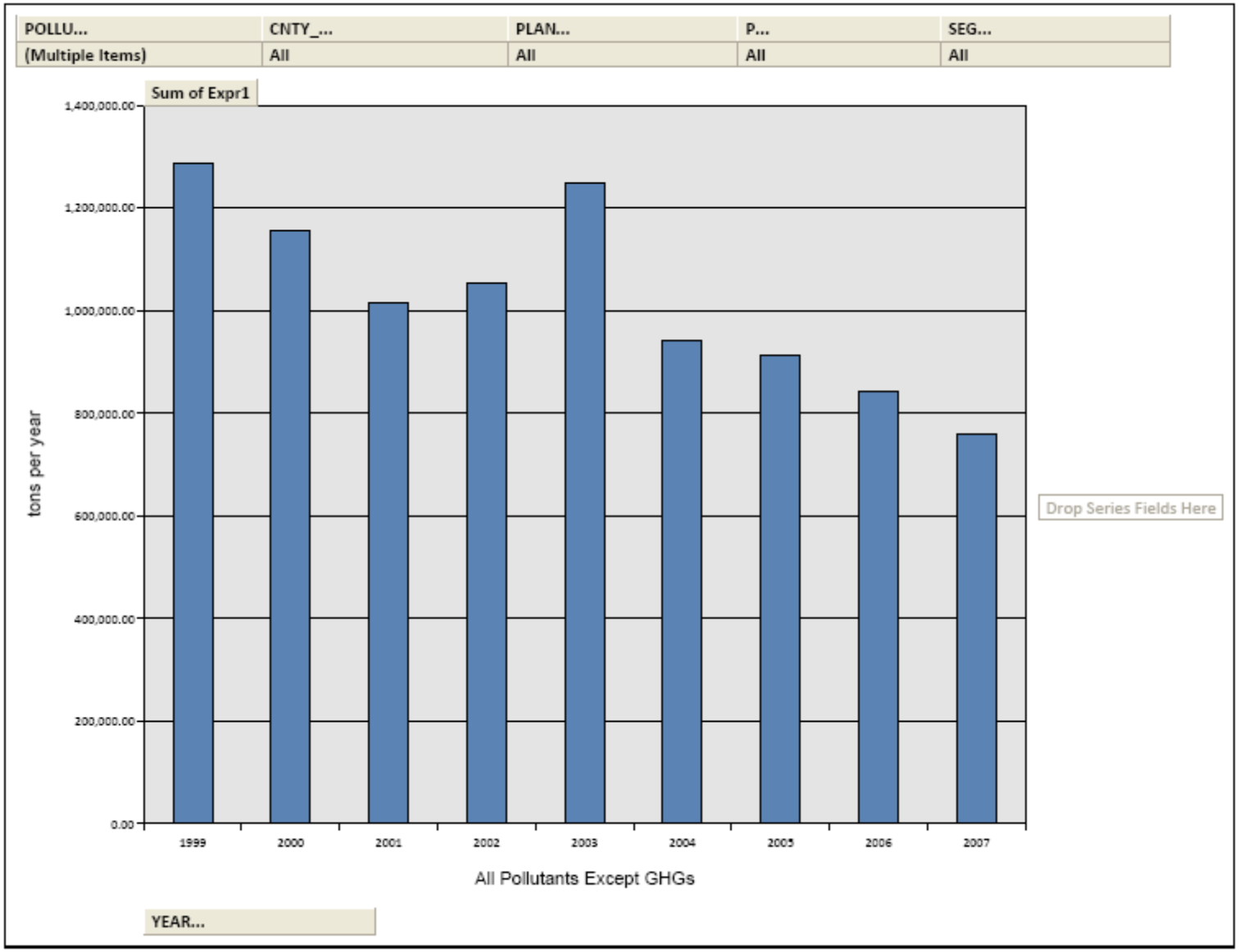
Common Problems (cont'd)

- Oxides of nitrogen confusion
- expand NO tons to the weight of NO2
- do not include N2O – N2O is a GHG

- Plant location coordinates

Common Problems (cont'd)

- Factor of 10 (slipped a digit)
- Factor of 2000


POLLU...
CNTY_...
PLAN...
P...
SEG...
(Multiple Items)
All
All
All
All
Sum of Expr1
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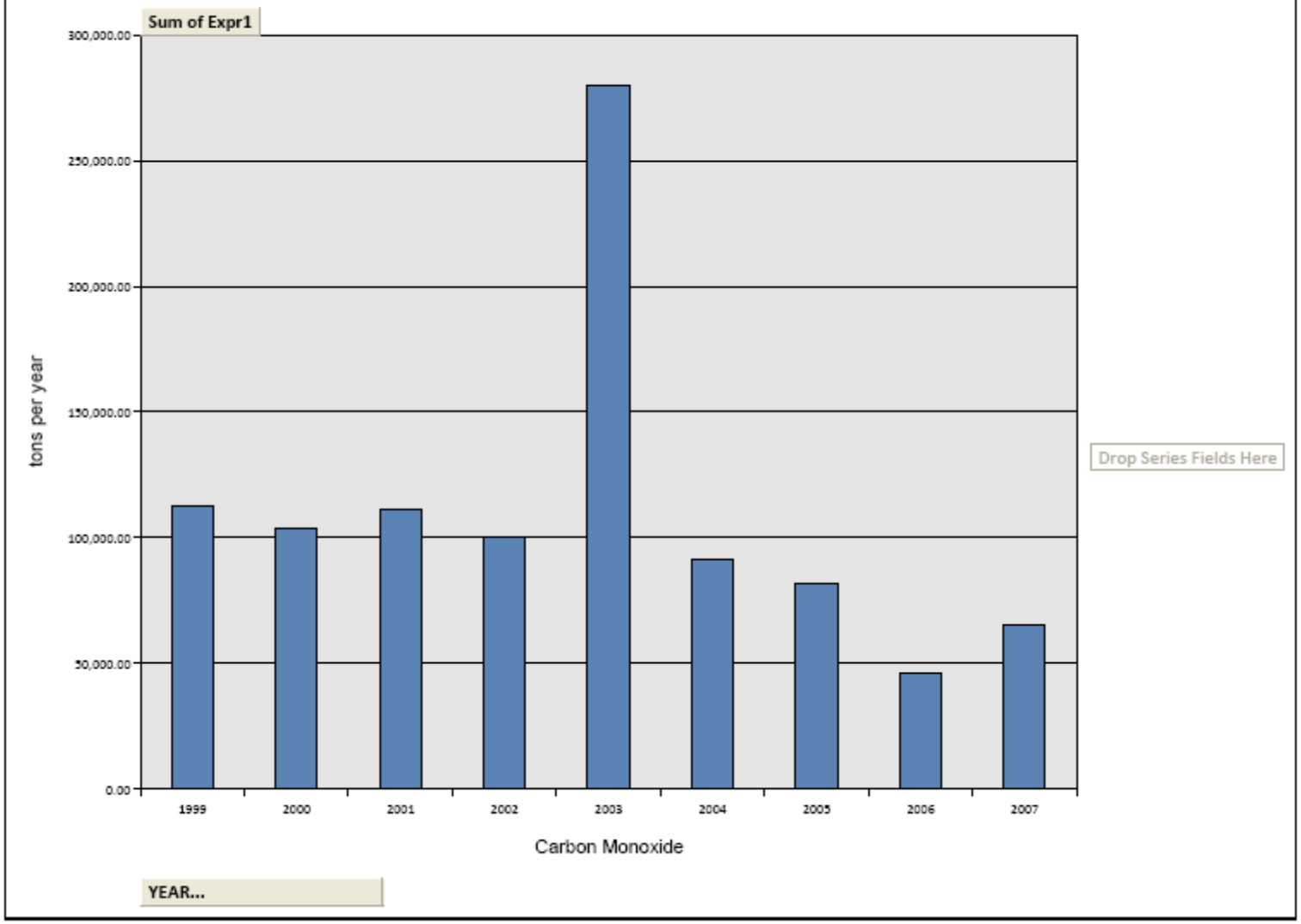
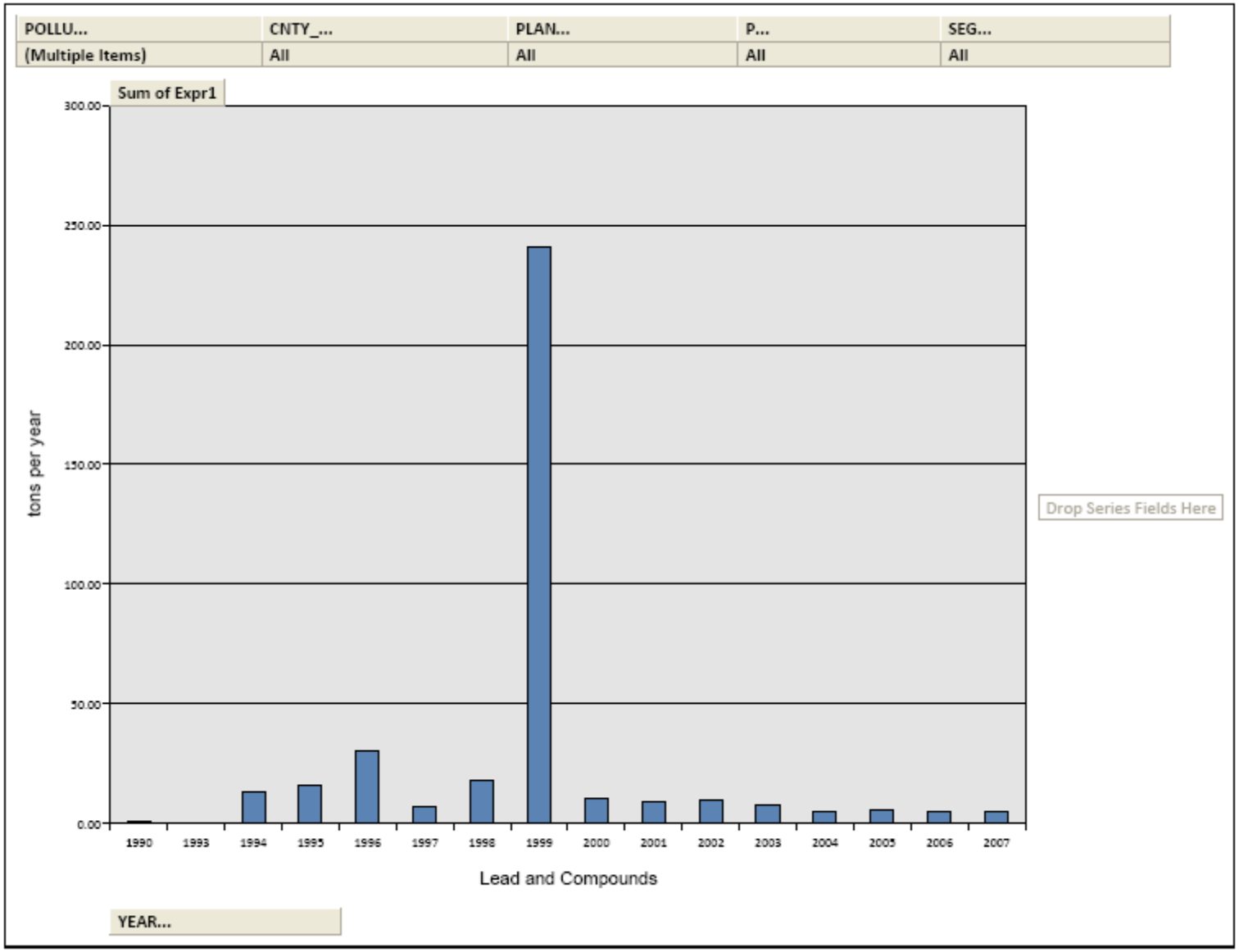
1,200,000.00
1,000,000.00
800,000.00
600,000.00
400,000.00
200,000.00
0.00
tons per year
1999
2000
2001
2002
2003
2004
2005
2006
2007
Drop Series Fields Here
All Pollutants Except GHGs
YEAR...

POLLU...	CNTY_...	PLAN...	P...	SEG...
CO	All	All	All	All




POLLU...
CNTY_...
PLAN...
P...
SEG...
(Multiple Items)
All
All
All
All
Sum of Expr1
300.00
250.00
200.00
150.00
100.00
50.00
0.00
tons per year
1990
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
Lead and Compounds
Drop Series Fields Here
YEAR...

- Questions?

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